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Correlating the morphology of poly(L-lactide)/poly(butylene succinate)/graphene oxide blends nanocomposites with their crystallization behavior

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Abstract. Bio-based blend nanocomposites of poly(L-lactic acid) (PLLA) and poly(butylene succinate) (PBS), with different concentrations (from 0.1 to 0.5 wt%) of graphene oxide (GO), are prepared via solution dispersion of PBS/GO followed by melt blending with PLLA in a 70/30 PLLA/PBS weight ratio. Scanning and Transmission Electron Microscopy reveals micron-sized droplets of PBS in the PLLA matrix with the GO nanofiller preferentially found in the PBS phase. The GO acts as nucleating agent for both semicrystalline polymers. The nanofiller nucleating effect is compared to the one of own self-nuclei for each polymer, to define a convenient nucleating efficiency (NE) scale. A value of around 80% is determined for GO towards PBS, among the highest NEs ever reported for this polymer. On the other hand, the efficiency in nucleating PLLA is equal to a modest 15%, also due to the uneven distribution of the nanofiller in the two polymers. A close relationship between the nanocomposite morphology and crystallization behavior of the two different polymers is thus established.

Keywords: *nanocomposites, graphene oxide, polylactic acid, poly(butylene succinate)*

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